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Intermediate frequency modes in resonance Raman spectra of single-wall carbon nanotubes CRISTIANO FANTINI, ADO JORIO, MAURICIO SOUZA, UFMG, Brazil, RIICHIRO SAITO, Tohoku University and CREST JST, Japan, GEORGII SAMSONIDZE, MILDRED DRESSELHAUS, MIT, MARCOS PIMENTA, UFMG, Brazil — Intermediate frequency modes (IFMs) appear in resonance Raman spectra of single-wall carbon nanotubes (SWNTs) in the spectral range between 600 to 1100 cm^{-1}. Early studies indicated that IFMs exhibit dispersion with excitation wavelength. Recently, we conducted an extensive study of IFMs with many laser excitation wavelengths on SWNT samples prepared by electric arc discharge. This study revealed the step-like nature of the IFM dispersion for E_{33}^S and E_{44}^S transitions in semiconducting SWNTs, that was attributed to a phonon assisted electronic resonance mechanism that is highly selective of IFM excitation from low chiral angle (zigzag-like) SWNTs. In the present work we perform similar measurements on HiPco SWNT samples featuring E_{11}^M transitions in metallic SWNTs, observing similar step-like dispersive behavior, thus allowing us to further confirm and refine the theory of IFMs. The new theory of IFMs enhances the potential of using resonance Raman spectroscopy for SWNT sample characterization.

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